PHILOSOPHICAL TRANSACTIONS.

IX. *Some Account of a new Volcano in the Mediterranean.* *By* JOHN DAVY, *M.D. F.R.S., Assistant Inspector of Army Hospitals.*

Read December 22, 1831.

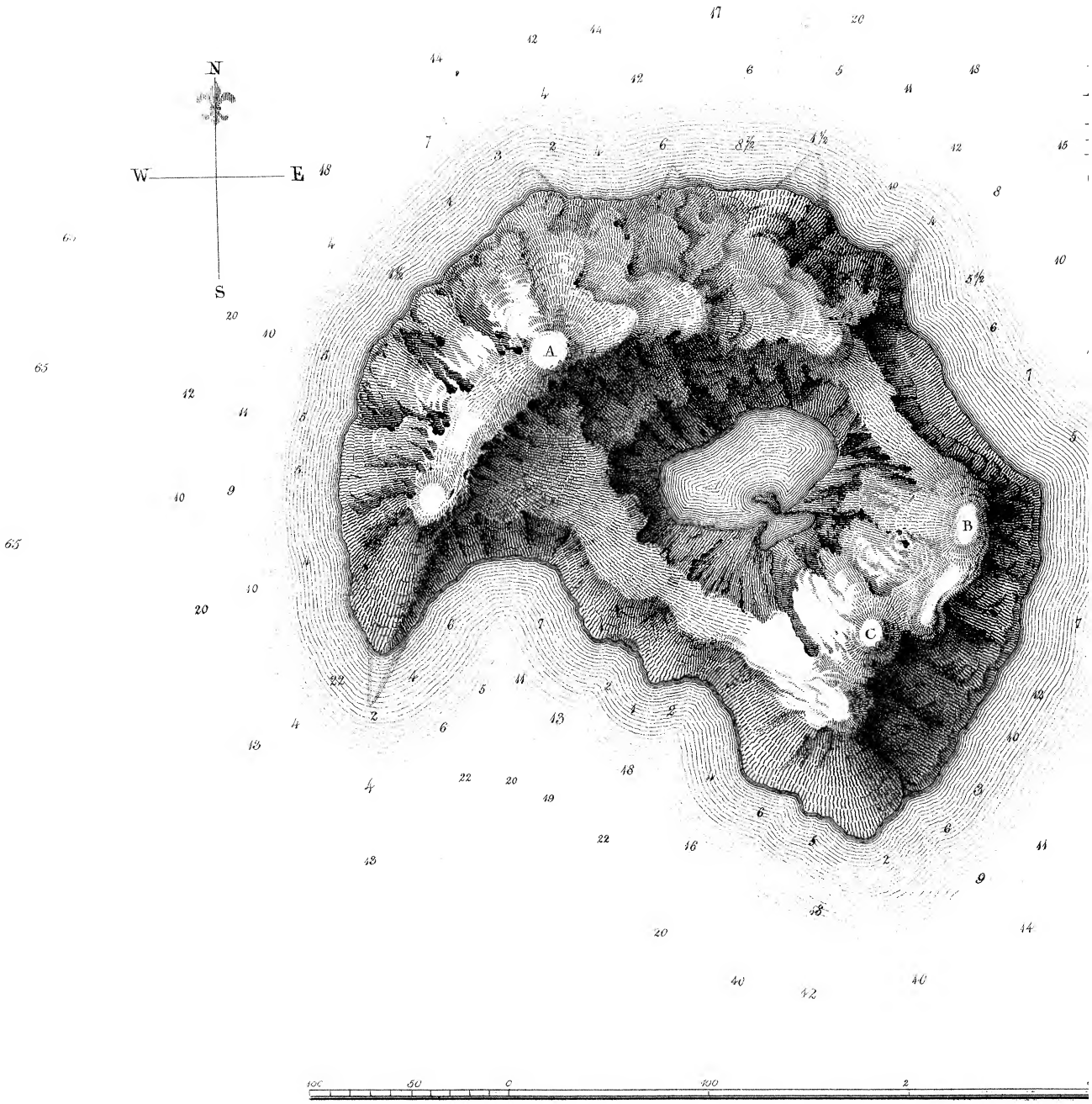
IN this communication I shall have the honour of laying before the Royal Society the information I have been able to collect respecting the volcano, which, three months ago, made its appearance off the southern shore of Sicily.

The first intelligence of its breaking out was brought to Malta, on the 16th of July, by a merchant vessel, the master of which stated, that on the 13th of that month, when passing between Sicily and the island Pantallaria, he witnessed columns of smoke rising from the sea, accompanied with a great noise, about twenty-five miles to the southward of Schiacca. The correctness of this report was confirmed by that of others, and all doubts that might exist respecting the nature of the phenomena were soon removed by the arrival in port of Captain SWINBURNE commanding HIS MAJESTY'S sloop Rapid.

From the interesting statement of this officer, which was published in the Malta Gazette, it appears that on the 19th of July, when he succeeded in approaching very near the volcano, its crater was raised only a few feet above the level of the sea; that it was then in great activity, emitting vast volumes of steam, ashes, and cinders, without flame or red-hot matter; and that there was a constant flux and reflux of the sea by a breach in its side. Captain SWINBURNE remarks, that when passing the same spot nearly a month before, namely on the 28th of June, several shocks of an earthquake were felt; so there can be no doubt that the cause which produced the eruption was then in operation.

From the 19th of July till the 16th of August, the volcano continued active, and was gradually enlarged in all its dimensions. Partly owing to the curiosity of individuals, but chiefly to the watchful care of Vice-Admiral Sir HENRY HOTHAM, during this period it was almost constantly under observation. Its activity appears to have been greatest about the 7th of August, when it was visited by Captain IRTON, of the 2nd batallion of the Rifle Brigade, who made a very successful series of sketches and drawings, exhibiting its different appearances, both at rest and in action; copies of some of which, through his kindness, are annexed. At this period it emitted more ignited matter than previously or afterwards, but even then its fire was rarely distinctly visible by day. Its eruptions, it may be inferred, ceased suddenly, for on the night of the 15th of August it was seen in a state of considerable activity by a party of officers of the 73rd regiment, and two days after, when visited by another party composed of officers of the Rifle Brigade, it was in a tranquil state, emitting merely steam or aqueous vapour. Since that time there has been no fresh eruption.

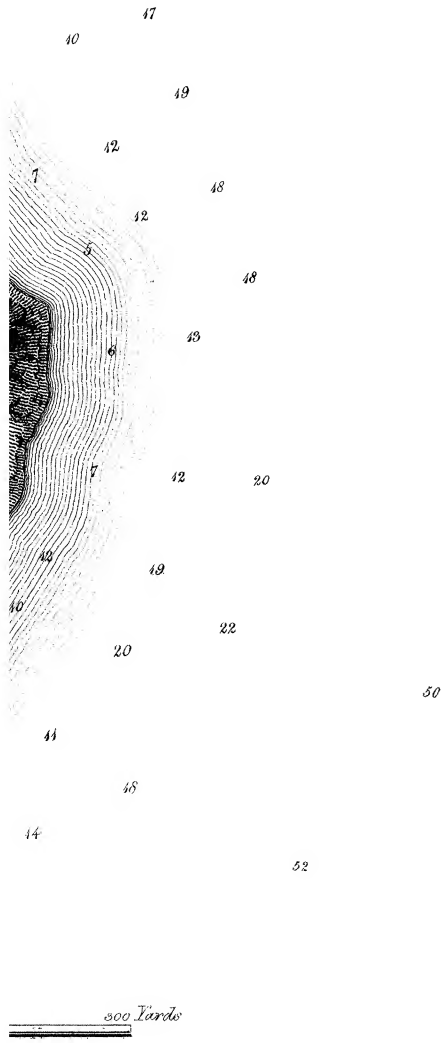
Whilst the eruptions lasted, there is reason to believe that the form and dimensions of the volcano were almost constantly varying, according to the quantity of ashes discharged, and the violence of the explosions. When in a state of rest, between the 20th of August and the 3rd of September, during a period of fine weather, it was carefully examined by Captain WODEHOUSE, R.N. commanding HIS MAJESTY'S brig Ferret, who landed on it repeatedly and ascertained its exact dimensions. He has been so obliging as to favour me with a plan of it, taken from actual survey, a copy of which, with his permission, I shall attach. (Plates V. and VI). According to this survey, the circumference of the island was about 3240 feet, and its greatest height 107 feet, and the circumference of the crater was about 780 feet. He found the surface tolerably cool, and composed entirely of ashes and cinders without any lava. The crater contained turbid salt water of 200° FAHR., from which, besides aqueous vapour, there was a constant disengagement of gas. He had specimens of the ashes and scoriæ collected, and also of the water and gas, which he did me the favour of sending to me on his arrival at Malta, and which I shall revert to hereafter. As far as the sounding-lead could be thrown into the crater, the water was very shallow, not exceeding three or four feet; and the crater was evidently filling up rapidly, by the falling in of its margin.



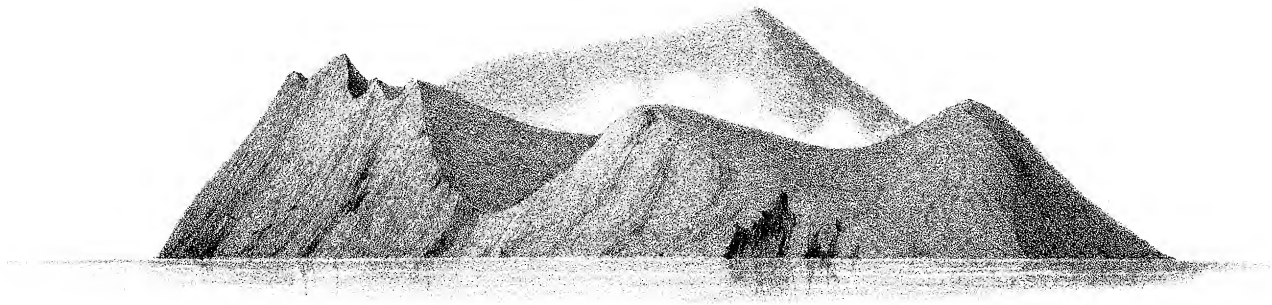
GRAHAM ISLAND.

C. Hullmandel's Lithography.

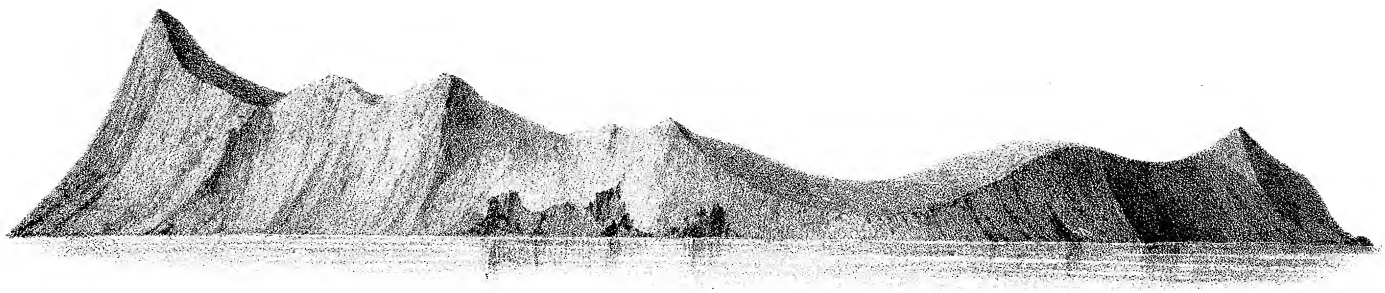
Lat: 37.°8′.36″ *N.*
Long: 12.°42′.45″ *E.*
A. *107 feet.*
B. *85* ..
C. *96* ..



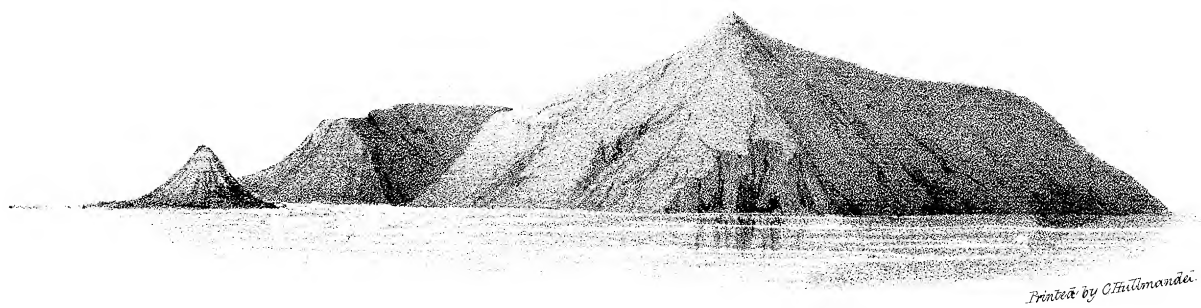
Bearing N. N. E. distant 2 miles.



S. S. E. distant 1 mile.



S. S. W. distant 1 1/2 mile.



Printed by C. Hullmandel.

N. W. 1 mile.

GRAHAM ISLAND

August 7th 1832.

This is a very brief sketch of the progress and present state of the volcano. From its commencement till now, I have not been able to ascertain that anything remarkable has occurred in the adjoining volcanic regions. At Schiacca, it was stated that the hot sulphureous springs at one time had become cold, and at another had ceased to flow; but I believe this was merely idle rumour; the truth of it has been denied by persons who had opportunities of being accurately informed. It was also stated, that at the commencement of the appearance of the volcano, Etna was more active than usual, and that severe earthquakes were felt at Catania. The occurrence of shocks of earthquakes has been confirmed, but not the increased activity of the mountain; on the contrary, I have been assured that it then emitted less than its ordinary quantity of smoke. The volcano of Stromboli, I have been informed, exhibited its usual appearance, and nothing uncommon is reported to have occurred in any other of the Lipari Islands.

Reflecting on the peculiar situation of the new volcano, many miles distant from land, and rising out of a comparatively deep sea, I indulged in the hope that, by a careful examination of the phenomena of its eruption, some information of a satisfactory kind, either positive or negative, might be obtained respecting the cause to which it owed its origin, and respecting the causes of volcanos generally.

I shall now give the observations which I made, with this object in view, on the 5th of August, when, through the kindness of Captain Wodehouse, I visited the volcano in the vessel under his command. The volcano that day was in a state favourable for the purpose; it was rather more active than usual; dense white vapour was constantly rising from it, and, at uncertain periods, about every two or three hours, explosions took place, and immense volumes of white vapour, mixed with, and sometimes obscured by ashes and cinders, were thrown out and projected to a great height, but without any appearance of fire.

To observe the phenomena more closely, we quitted the brig, which lay-to about two or three miles off, and proceeded towards the volcano in a boat. This was about ten o'clock A.M., when the volcano was most active. We first approached it to windward, to have an opportunity of observing narrowly the appearances. The wind being fresh, the ashes and cinders fell principally on

the other side, in which direction the smoke and vapour were driven. The sea, within two or three hundred yards of the volcano, was clear and transparent, and of the usual dark blue of the Mediterranean. Nowhere could I observe any ascent or bubbling of gas in the water; nor did we feel any shock or commotion when eruptions took place. The appearances of the eruptions were almost constantly varying, according to the nature and quantity of the matters thrown out. The most common appearance was that of dense white vapour, resembling snow or bleached wool, which, thrown up in continuous masses, rose to a great height, and assumed various extraordinary forms. This effect, in all probability, was chiefly owing to the vapour of water. At first, from its great density, I was disposed to believe that the vapour might contain muriatic acid or muriate of ammonia, or the hydrated boracic or fluo-boracic acid; but none of the products which I afterwards examined were favourable to this idea. When I watched carefully a cloud of this vapour, floating before the wind, it gradually dissolved, and at last entirely disappeared, with the exception of a very faint, just perceptible, gray vestige, which was probably very fine dust, and perhaps saline matter derived from salt water. When the eruptions were most violent, the white vapour was followed by columns of perfectly black matter, which sometimes rose to the height of, perhaps, three or four thousand feet, and spread out very widely, even to windward. Once or twice there was an appearance of lurid fire. When the eruptions were of moderate strength, the columns of black or brown matter, intermixing with the masses of white vapour, or ascending through them, produced appearances very novel and impressive. The sounds attending the eruptions were not very loud; they resembled more the rumbling of heavy carriages on a pavement, than the reports of explosions. The thunder, produced by the lightning, which was almost constantly darting in various directions in the atmosphere of the eruption, much exceeded the subterraneous sounds in intensity. I watched, when the lightning was most vivid and the eruption of the greatest degree of violence, to see if there was any inflammation occasioned by this natural electric spark,—any indication of the presence of inflammable gas; but in vain.

Having satisfied our curiosity on this side, we proceeded towards the other, skirting the margin of the dense clouds of vapour and ashes which descended

and spread over the surface of the sea. In passing, we saw the breach, through which there appeared to be a current constantly setting into the crater, and the water on the outside in an apparent state of ebullition. To leeward the sea was very much discoloured, and rendered turbid by ashes and dust; and cinders in plenty, of a very light kind, were floating on the surface. To ascertain if there was any peculiar smell belonging to the eruption, we passed a little within the skirts of the cloud, and the wind then freshening, we found ourselves in the midst of a dark shower of ashes, which fell with the force of fine hail, covered our persons, and almost blinded us. It was not in the slightest degree heated; indeed the wind that brought it, and which appeared to come from the atmosphere of the volcano, was unusually cool. The dust was quite dry, and some that collected on the folds of our dress had a strong saline taste: I shall revert to it again in considering the chemical nature of the products. Excepting once or twice when we perceived a slight smell of sulphur, no unusual odour, not the slightest bituminous smell, or smell of sulphuretted hydrogen, or of sulphurous acid, or of any other acid fume was observable.

Shortly after we had pulled out of this cloud, the volcano became quiet; and, the wind dispersing the vapour, the island appeared unobscured. We were so near to it, that it appeared practicable to reach it, and procure some specimens of the matter of which it was composed. When we were within about a boat's length of its precipitous shore, Captain Wodehouse ordered soundings to be taken; and it was found that the depth of the water was eight fathoms. Whilst part of the boat's crew were engaged in pulling in the lead, we had warning of an eruption by a rumbling subterraneous sound, immediately followed by the projection of a column of vapour, and which in a few seconds was succeeded by an eruption of ashes and cinders. The larger and heavier masses passed over us, and fell at a distance. For about half a minute, we were nearly in complete darkness, owing to the thickness of the dust and ashes ejected. I held my breath as long as possible, not expecting that the vapour would have been respirable; but, when obliged to breathe, I found no inconvenience from it, nor did Captain Wodehouse, or any of the boat's crew. For a moment I felt a hot blast; but this was very partial, and was not perceived by any one else in the boat. There was no unpleasant smell or acid fume of any kind. The eruption was slight, and of short duration;

in a few minutes the vapour was dispersed by the wind, so that we were able to see, and hasten to a distance. We found ourselves completely wetted with salt vapour or spray, and covered with wet ashes, of which I had no difficulty in collecting a sufficient quantity for examination. After this we returned on board.

Both in coming from the brig and nearing the volcano, and in returning, I paid attention to the temperature of the sea, and ascertained it by the thermometer. At 10 A.M., when we entered the boat, at the distance of two or three miles from the volcano, the sea at the surface was 80°, which is about the average temperature of this part of the Mediterranean in the month of August. To windward, as we approached the volcano, the temperature of the surface varied from 79° to 78°; to leeward, it was lower; when within about twenty yards of the volcano, it fell to 70°; and when nearest, within six or eight yards, it was 72°. On leaving it, the temperature gradually rose; when about a mile from it, to leeward, and still in turbid water, it was 76°; a little beyond this the water suddenly became clear, and the thermometer immersed in it rose to 79°. This low temperature of the water, close to an active volcano, is not what might be expected at first, and it appears paradoxical. It is probably owing to one or both of two things; either to the fall of cinders and ashes into the sea, projected so high as to be cooled in their ascent, bringing down with them the low temperature of the upper air; or, to the concussions from the eruptions throwing up cold water from the bottom of the sea. This latter supposition is so much the more probable, as there was a pretty rapid current flowing by the island at the time, the necessary effect of which must have been to prevent the accumulation of heat.

The whole of the night of the 5th we remained off the volcano, and in the evening and the early part of the night we witnessed some considerable eruptions. The reports attending them were much louder than in the morning; some of them resembling the reports of heavy artillery, and others the discharge of muskets; these latter were solitary, and occurred at intervals. The fire was very distinct in the darkness; but even when brightest, the ashes and cinders thrown up seldom exceeded a dull red heat. Twice or thrice I saw small masses shoot up, of a glowing white heat; but I was doubtful, at the moment, whether the effect was from electrical light or ignited matter. As

in the morning, I watched carefully for the appearance of flame, but could not detect it; the lightning traversed in various directions the volcanic atmosphere, but it was never accompanied by any appearance of the explosion of inflammable gases.

The results of the preceding observations are all of a negative kind. Still hoping to ascertain something positive relative to the cause of the phenomena, after my return I availed myself of every opportunity of examining the productions of the volcano, and through the kindness of several friends I have been liberally supplied with materials.

The solid products, or matters ejected, which I have examined, have appeared to differ more in form than in chemical composition. They have occurred in the form of fine sand or ashes, of very porous light cinders, of comparatively heavy and compact cinders, and of fragments of vesicular lava; of the last variety of product, I have seen only two small specimens, which were taken from the crater on the 2nd of August, by Captain SENHOUSE, R.N., who was the first who succeeded in landing on it, and who has proposed for it the name of "Graham Island." Both these masses were of a dark gray colour, contained augite, and very much resembled vesicular basalt, or the common lava of Etna and Vesuvius, such as is quarried at Portici and at Catania. The specific gravity of one of them was 2·07; that of the other, which was more compact, 2·70. The very light, spongy cinder, which abounded floating on the sea, varied in colour between black and gray. Reduced to fine powder by trituration, and the greater part of the entangled air got rid of, it sunk in water, and was found to be of the specific gravity 2·64. The fine sand or ashes, which fell in our boat when we were in a shower of it, was of the specific gravity 2·66, and some which fell on us in the eruption, close to the volcano, 2·75. The cinders, of which the crater appears principally to consist, are commonly of a dark colour, and almost black, and they are generally very porous or spongy. Occasionally they are coloured superficially by yellow ochre, or a crust of clay mixed with a little peroxide of iron. One specimen, reduced to powder, was of the specific gravity 2·74.

Every specimen of solid matter that I have examined has contained saline matter similar to that of the sea, and a slight trace of sulphur. In every specimen tried, reduced to fine powder, there were particles which were attracted

by the magnet. None effervesced with acids; all were readily fusible before the blowpipe, and ran into a black or dark green glass. I could not detect in any of them the smallest trace of carbonaceous matter, or any free acid, or alkali, or uncombined alkaline earth. From experiments which I made on small portions of each kind, they all appeared to consist of alumine, lime, magnesia and silex coloured by protoxide of iron, and without any potash. The absence of crystalline structure was very remarkable in all of them, with the exception of the small masses, already alluded to, of vesicular lava *.

I have already mentioned that I was indebted to Captain Wodehouse for a specimen of the water of the crater, taken up soon after it had become tranquil, and when its temperature was 200°. He furnished me with three wine-bottles full,—one of them from that part of the crater which was almost separated from the main crater by a bar of cinders, and was called the "small crater," and two from the main crater. They were well secured with corks.

The specific gravity of the water from the "small crater" was 1·057; that of one from the main crater was 1·069, and that of the other 1·070. In properties and composition they appeared to be very similar. They were free from any odour, of a dirty fawn colour, from a fine dust which was suspended in them, and which on rest subsided; after which they became perfectly clear and colourless.

The sediment obtained by filtering the water from the main crater (about three pints) weighed thirty grains. It consisted of a light brown ochrey pow-

* Since writing the above, I have been favoured by Captain Senhouse with four specimens of rock ejected by the volcano, which from their nature it may be inferred were thrown up from the bed of the sea. Three of these are water-worn pebbles, different varieties of limestone; one of them is highly crystalline dolomite, containing a considerable quantity of magnesia; another is finely crystalline, and contains a smaller proportion of magnesia; and the third is of very fine grain, not crystalline, with only a trace of magnesia. The fourth specimen, which is a fragment of a mass said to have been of several pounds weight, has a good deal of the character of graywacke. It contains, disseminated through it, in a solid state, saline matter, chiefly common salt. It effervesces with acids, and gelatinizes. From the few experiments I have made on it, it appears to be composed of a large proportion of silica, and of lime, magnesia, and alumine in about equal proportions, and to be coloured by protoxide of iron. Whether it contains any lime or magnesia not combined with carbonic acid, I have not ascertained. It is of considerable hardness and toughness, and is infusible before the blowpipe. Portions of its surface are covered with a vitreous fusible scoria, similar to that of the volcano, as if it had passed through, or come in contact with the fused matter of the volcano.

der, of a fine blackish dust, and of fibres, in appearance not unlike vegetable fibres. No carbonate or sulphate of lime could be detected in it, and only a very slight trace of sulphur. The dust and powder were very fine volcanic dust; the black, as ejected; the yellowish brown coloured by peroxide of iron, instead of the protoxide, probably from the action of the atmosphere on the latter. The fibres resembling vegetable fibres consumed before the blowpipe, with a smell very like that of sea-weed burning; and it may be conjectured that they were derived from sea-weed drawn into the crater. The same kind of fibres, it may be remarked, were frequently to be seen on specimens of cinders brought from the volcano; and their origin, it may be supposed, was the same.

The water from the "small crater" after the separation of its sediment, evaporated to dryness with great care over boiling water, afforded 8·6 per cent. saline matter. The water from the main crater (the two bottles mixed) similarly treated, afforded 10·6 per cent.

From the experiments which I have made on these specimens of water, they appear to differ chiefly from the water of the Mediterranean, not in their principal saline ingredients, but in containing more sulphate of lime, and a little alumine, oxide of iron, and a trace of oxide of manganese, all three in combination with an acid, probably the sulphuric and muriatic,—and a notable portion of hyposulphite of lime and magnesia. I could not detect in either of them any free acid or alkali, or the presence, even in combination, of any potash, ammonia, or nitric acid; nor the slightest trace of bromine or iodine. In quest of these latter substances, 77 cubic inches of the water from the main crater were carefully evaporated, and the greater part of the whole from the "small crater"; and the most approved tests, as recommended by M. Balard, were applied to the deliquescent salts extracted by alcohol, without the slightest indication appearing of either of them. A solution of chlorine very carefully dropped into the concentrated saline solution occasioned no discoloration; and the starch solution did not produce any tint of blue, whether the chlorine was used alone, or added to the salt with excess of sulphuric acid.

For comparison, I took up from the sea, in returning from the volcano, six different specimens of the water of the Mediterranean. No. 1. was taken up about forty yards from the volcano, and was slightly turbid. No. 2, about three miles from it, where the sea was clear. No. 3, about five miles distant.

No 4, about three miles from Cape Bianco, in the neighbourhood of Girgenti. No. 5, between Girgenti and Gozo, in lat. 36° 33′, long. 13° 31′. And No. 6, about a mile off Gozo. I ascertained their specific gravity with great care, by means of a delicate balance of Robinson's, and found it the same in each instance, viz. 1·0287, water at 75° Fahr. being 1·0000, which is about the average specific gravity of the surface water of the open parts of the Mediterranean in the summer season *. I ascertained also with care, the saline residue which each specimen afforded, evaporated over boiling water and exposed to this temperature as long as any loss was sustained. The evaporation was made in a silver capsule, which was weighed as speedily as possible and whilst still warm. The residue per cent. of each was as follows:

No. 1	4·46
2	4·43
3	4·40
4	4·39
5	4·43
6	4·33

Even these slight differences of the quantity of saline residue might have been, and probably were owing to the circumstances of manipulation, and the state of the atmosphere in relation to humidity when the experiments were made. In all of them were discoverable a slight trace of sulphur and an extremely minute quantity of iodine. The apparent absence of the latter substance in the water of the crater, might either have been owing to the high temperature to which it had been exposed, and to which its superior specific gravity is to be attributed, or to the presence of the hyposulphites, which perhaps might have masked such a very minute quantity, if present.

I have now mentioned all the products of the volcano that have come to my knowledge, excepting the gaseous. The specimens of gas (two in number) which I received from Captain Wodehouse were in the wine-bottles in which they had been collected. One was full of air; the other contained about four fifths air and one fifth turbid water of the volcano. They had merely been

* In bays in which no rivers empty themselves, I have found the specific gravity of the water higher; and towards the embouchures of great rivers lower, as in the Adriatic and the Hellespont.

corked, and had not been preserved with any of the precautions requisite to have prevented the escape of some of their gaseous contents and the admission of atmospheric air. As soon as I received them (it was at night), they were inverted in water, and the following morning they were examined. In the first-mentioned bottle, which had been full of air, a little water had entered so as to fill about half its neck. On withdrawing the cork under water, water rushed in equal to about one quarter of the capacity of the bottle. The air remaining had a slight smell of sulphuretted hydrogen; it extinguished a taper plunged into it, and was not itself inflammable; 50 measures of it by lime-water were reduced to 16; and these by phosphorus were reduced to $13\frac{1}{2}$; sulphur sublimed in this residue occasioned no alteration of volume.

The air in the other bottle containing some water had no smell of sulphuretted hydrogen; 48 measures of it by lime-water were reduced to 33, and these by phosphorus to 31; and this residue was not inflammable, and extinguished flame.

From these results it may be inferred that the gas in the first-mentioned bottle consisted chiefly of carbonic acid and azote and a little oxygen with a trace of sulphuretted hydrogen; and that the gas in the second bottle was principally azote with a little oxygen and carbonic acid. Considering the manner in which the bottles had been kept, it is highly probable that the azote and oxygen were derived from atmospheric air, unconnected with the volcano, and that the carbonic acid and trace of sulphuretted hydrogen alone were of volcanic origin. The presence of the acid gas is easily accounted for, supposing it to be derived by the action of heat from rocks containing carbonate of lime and magnesia, earths which we have seen are contained in the cinders and ashes ejected. In one place outside of the volcano, in the sea, Captain Wodehouse observed a great bubbling of air, as if the water was boiling; he approached it and even went over it in a boat, and found its temperature not above that of the adjoining surface, and there was no peculiar odour perceptible. It is to be regretted that none of this gas was collected; but, probably, it also was carbonic acid gas, and arising from the calcining effect of heat on the subjacent rocks forming the bed of the sea. Shortly after, it is said, the bubbling continuing, the water became very hot, which is confirmatory of the above conjecture.

I have stated already, that whilst I was at the volcano, no indications appeared of the disengagement of any inflammable gas, and not even of any acid gas or vapour. I have conversed with many gentlemen on whose accuracy of observation I could place dependence, and their experience agreed with mine, excepting that one or two of them perceived distinctly acid fumes, which, from the description given of their effects when respired, it may be inferred were of sulphureous acid. Probably a little sulphuretted hydrogen also was evolved; but it must have been in extremely minute quantity, otherwise it could not have escaped notice. In the gas I examined, the trace of it was so slight that it was not discoverable by means of freshly precipitated oxide of lead; a few particles of it agitated with the gas, were not in the slightest degree discoloured.

In an account of the volcano, published in the Malta Gazette of the 25th August, it is stated that carburetted hydrogen was evolved from it, and that coal deprived of bitumen occurred amongst the ashes and scoriæ. As the writer does not appear to have ascertained either of these points in the only way in which they could be determined in a satisfactory manner, namely by experiment, I am under the necessity of supposing that his statement in these particulars is not correct, and that the appearances to which he trusted were fallacious.

The results of my latter inquiries, it will be perceived, like those which preceded them, are entirely negative; and they are very similar to those which my brother, the late Sir Humphry Davy, obtained at Vesuvius, which he has described in a paper, "On the Phenomena of Volcanos," published in the Philosophical Transactions for 1828; and reasoning on them in relation to the theory of volcanos in general, they appear very favourable to that hypothesis of volcanic action to which he gave the preference, both in the paper just alluded to, and still more decidedly in his posthumous work, "Consolations in Travel;" namely, the simple hypothesis of an ignited nucleus of fused matter, occasionally forced through the cooled crust of the earth by the expansive power of steam and gas. In the present instance, all the phenomena and circumstances of the volcano happily accord with this view. The situation of the eruption, many miles distant from the nearest shore, seems to be incompatible with its having any connexion with the atmosphere; and this

idea is supported by the depth of the sea where the volcano appeared,—a depth which, according to the most accurate survey, must have been at least 50 or 60 fathoms. Further, the products examined, whether solid or gaseous, may be said to demonstrate that ordinary combustion was nowise concerned in the phenomena; and the absence of inflammable gas in any efficient quantity, (of which it appears to me no doubt can be entertained,) seems no less forcibly to demonstrate, that the decomposition of water by the metallic bases of the earths and alkalies, cannot be admitted as the principal cause. On the other hand, if we suppose a state of things in conformity with the hypothesis of our globe having been once in fusion, and being still so at a certain depth beneath the surface, liable to be acted upon by water flowing in from above, the phenomena of the volcano do not seem to be of difficult explanation; they are indeed such as might be expected à priori; namely, the vast quantity of aqueous vapour evolved impregnated with salt; the porous cinders and ashes ejected; the comparatively low temperature of the ejected matters, and the apparent absence of any gas in considerable quantity, excepting carbonic acid. All the other observations which I have made at different times in the volcanic regions of Italy, Sicily and the Lipari Islands have been of the same negative character as the preceding, and favourable to the same hypothesis rather than to that of the chemical origin of volcanos. The subject however is so mysterious, that what is probable, on further inquiry may not prove true; and other causes may be discovered, which at present are not even imagined.

Malta, October 25th 1831.

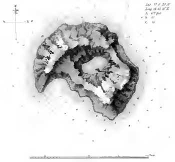
Explanation of the PLATES.

PLATE V.

A plan of the island, with soundings from a survey by Captain WODEHOUSE. Its outline and that of the crater is from observation. The ground has been sketched in by Captain IRTON, partly from views which accompanied the original plan, and partly on supposition.

PLATE VI.

Fig. 1—4.—Profile views of the volcanic island as it appeared on the 7th August.


Lat
Long
A.
B.
C.